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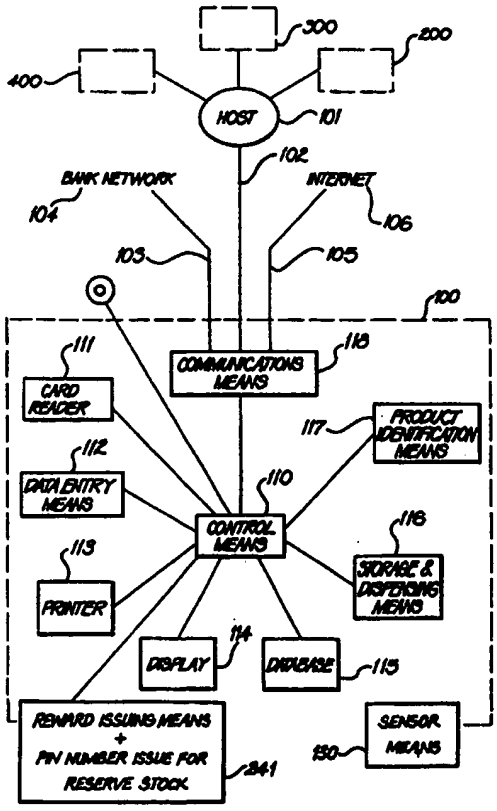
(57) Abstract

Method/apparatus of automatic retailing and vending for facilitating remote ordering of goods/services and provision of goods/services including plurality of ordering apparatus which are connectable via a communications network to a host device which includes intelligent retail shelf to store products, and means for issuing and receiving coupons and effecting rewards.



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IMPROVED ELECTRONIC ORDERING AND VENDING SYSTEMS

The present invention relates generally to retailing systems and in particular to an automated retailing and/or vending system, particularly for facilitating the remote automated ordering of goods/services and provision of goods/services (products).

The co-applicants, Imaging Technologies Pty Limited, have made a number of patent applications relating to automated retailing and vending systems and devices. The disclosure of the co-applicants earlier filed international patent applications PCT/AU93/00416, PCT/AU95/00154 (publication numbers WO94/04446 and WO95/26004, respectively) and PCT/AU97/00058 are incorporated herein by reference. PCT/AU93/00416 relates to a vending machine which facilitates recycling of complex articles, such as printer and toner cartridges. PCT/AU95/00154 discloses an electronic catalogue device and system for enabling remote ordering of goods/services. PCT/AU97/00058 discloses an improved electronic ordering system which, in particular, provides a considerable retailing network utilising PC's, dedicated electronic ordering devices (e.g., kiosks), combined vending and electronic ordering devices, or connected together via a communications network which may be the Internet to order and obtain any product.

The present invention relates to various improvements which have been made to the co-applicants retailing systems and devices.

One of the major advantages of conventional retailing, where a customer usually has contact with a salesperson or other customer service representative, is that the salesperson or representative is usually in a position to provide information on quality, age, other characteristics of an item which the customer wishes to purchase. Sometimes, the representative may even be in a position to provide details of availability of stock at another, remote location (perhaps by making a telephone call).

Conventional automated systems, such as vending machines are unable to provide the same amount of information that a human being is generally in a position to do. The co-applicants referenced applications provide systems and devices which provide information on products available via the systems and devices and can provide information on the type of product, location, etc. The present invention includes improvements to the provision of information.

Another facility of human interaction in relation to retail sales is the ability of the representative or salesperson to be able to provide marketing information for management purposes. That is, for example, including information on customers who the person is approached, the number of purchases actually made by customers, type of products that are most popular, etc.

Yet another feature of utilising human representatives for sales is that a reward system may be managed. That is, for example, a ticket may be provided with a purchase, which can subsequently be presented to a sales person at a check out, for example, in order to obtain a reward, such as a discount from the purchase of subsequent product.

The present invention provides a product ordering apparatus, comprising a control means for controlling ordering of products, input means by which a user may select products, and information means for determining and providing information on products available for retail via the apparatus.

Product may include goods and/or services. The product may be available on site, where a vending facility is provided by the apparatus. The product may also be remotely ordered from providers off-site, and there is preferably a communications means provided for connecting to a network, such as the Internet, to facilitate remote ordering of goods.

The network may include a plurality of ordering apparatus in accordance with the present invention,

preferably being connectable via the communications network to a host device. Such a network has been disclosed and discussed in co-applicants earlier patent applications.

Each of the ordering apparatus and the plurality of ordering apparatus is preferably separately addressable. This facilitates information exchange between the control means and between the host and the control means of each respective ordering apparatus of the plurality of ordering apparatus.

The information means is preferably arranged to determine and provide information on all characteristics and aspects of products which are available via the apparatus and retailing system (the system comprising a host and apparatus connectable over a communications network, or host and plurality of apparatus connectable over a communications network). The information may include the following:

1. Quantity or status of the products which may be stored within a vending facility within the apparatus.
2. The shelf life or age of products stored within a vending facility within the apparatus.
3. Pricing information relating to products stored within a vending facility within the apparatus and also available by remote ordering from a remote location.
4. Promotional or educational information relating to products available from the apparatus.
5. The version of a product stored within the device or available over the communications network.
6. The colour of the product stored within the device or available over a network.
7. The size of the product stored within the device or available over the network.
8. The brand of the product stored within the device or available over the network.

9. The supplier of the product stored within the device or available over the network.
10. The manufacturers part number and description of the product stored within the device or available over the network.
11. A unique tracking number relative to a product stored within the device or available over the network.
12. The machine type or model number that the product stored within the device is compatible with (or that the product available over the network is compatible with).
13. The location of products which are not stored within the apparatus that the user is accessing, but are available at other locations.

All of the above information may be presented to the customer via a display means, such as an CRT display, for example. The user may therefore obtain information on all products available over the network.

The ordering apparatus may comprise a dedicated device, such as has been described in co-applicants previous applications, and may also include a PC which is configured with appropriate software and communications means to connect to the system network. With such a PC, the user can remotely order from home and obtain information regarding products available at various apparatus within the locality of the user, or at a remote location where the goods can be collected by the user or by someone known to the user.

Preferably, where the user of an ordering apparatus or PC configured as an ordering apparatus locates a product that they desire to order, means are provided to advise the user that the product is available for delivery from devices attached to the network, means are provided to enable that user to reserve that product. Only the particular user that has reserved the product or someone

with the delegated authority of that user will be able to obtain the product item. Where the item is located in a vending apparatus which is part of the network, the vending apparatus will not enable delivery of the reserved product item other than to the reserver user. Preferably a security means is provided to the user who has reserved the product, such as a PIN number, bar code reference to the user's credit card or smartcard or the like. Means are preferably provided on the device which stores the reserved product, to respond to the input of a PIN number, detection of a bar code, or responsive to any other security means item, to release the reserved product. The security item could also be the users E-mail address.

Means enabling automatic payment is preferably associated with the ordering apparatus in accordance with the present invention, so that the users account can be accessed and debited or a transaction can be approved by way of credit card, bank card, etc. Means is provided for payment to be made at the ordering device (prepaid order) or at the delivery device prior to collection of goods.

Where a reservation of product feature is provided, stock may not be reserved until payment has occurred. Once payment has occurred or the payment transaction has been approved, then the PIN number, bar code or the like security means will be provided to the user of the device.

In a preferred embodiment, the user of one ordering apparatus in the system may effectively "log on" to another remote, or a host system that manages devices and determine if that device has stock available. Alternatively, or additionally, the apparatus may access information, which may preferably be stored in a database, to find a locality where the product desired by the user is stored.

Information on products stored by the ordering apparatus or available over the network is preferably stored in a database. Each ordering apparatus may have access to the database and in some embodiments the database

may be stored in a memory at the apparatus. Alternatively, or additionally, a main database may be stored at a host device and information obtained from the main database on-line by the apparatus.

Preferably, where the ordering apparatus stores product on site (i.e. has a vending function), information on the product may be obtained by physical sensors within the device, such as shape sensors (described in applicants earlier application PCT/AU93/00416) and/or by logic, processing, based on information stored or processed by the control means. The sensors may include any type of available sensor, such as infra-red, etc. Additionally, or alternatively, information may be provided by a code means associated with the product, such as a bar code attached to the product, for example, and bar code reader in the device, i.e., perhaps in the storage location for the product. Such coded information may include information on all the characteristics of the product, which information can then be accessed by the control means and provided to the user by a display or other output means (e.g., printer, voice, etc).

The information which is available for use may also include information on the actual location of the product within the device, where the product is stored on site, e.g., which chamber or shelf, whether in a delivery shute, in an output bin, etc.

All product information may additionally or alternatively be provided by a database which the device has access to.

The present invention further provides a product ordering system, comprising a plurality of ordering apparatus which are connectable via a communications network, whereby a user of the system can access the network and control means for providing information on available products and enabling a user to order the products.

Preferably the system includes dedicated devices as discussed above, as well as PC's. The dedicated devices may also include a vending facility.

The communications network may include any known communications networks, including the Internet.

Preferably, browser means are provided associated with the ordering apparatus and network, to enable the user access to various information, including products and services and web sites, on the Internet. Preferably, the system also includes means for prompting the browser that a particular product is available for order and a means for prompting that a product of interest is available for immediate delivery from a delivery device attached to the network. Means for prompting may also provide information to the browser regarding location of the product, information on the characteristics of the product, etc., (as discussed above) and how to order.

Preferably, where a user is made aware that stock is available at a particular location, the user can reserve that stock and collect it at a later date. Preferably, as discussed above, a security means may be provided for the user in order to identify the user when they collect the reserved product.

Where the system includes a plurality of devices, preferably each of the plurality of devices has a given address. PC based devices which may not be dedicated ordering devices may also be addressed where they are configured to be accessed by a user to obtain products over the system.

The system preferably includes a host device which is connectable via the communications network to obtain information from the ordering devices, whether the PC's, Network server or Web Server dedicated ordering devices, combined vending/ordering devices, etc., and also to down load data and information to and from the ordering devices.

Because the devices are addressable, it is possible for the host to control them in "groups". It is also possible for information to be provided on selected groups to the host processor and also to a user accessing the system.

The devices can be divided into groups depending upon any characteristic and preferably means is provided to facilitate access to information on the respective devices in terms of grouping by characteristic, location, etc. The control means preferably includes AND/OR logic functionality to facilitate control of the devices and access to information.

Preferably, the individual addressing capability enables data on each of the devices to be updated, such as pricing information, product information, user information, etc., on a group by group basis. For example, a number of devices may be located at a particular factory or office building and they may be controlled separately as a group from ordering devices in the rest of the system, to enable different product pricing, sales analysis, etc.

Further, preferably the ordering apparatus provided with means for a user to ask questions of the device, such as "how many and what ordering apparatus are available at a particular location?", and, because of the individual addressing facility, that information may be provided to the user at that device, by an output means such as a display, printed output, voice, etc. In a preferred embodiment a visual display is provided which gives a map showing the locality of the ordering apparatus that the user is interested in.

In this way, the user may locate devices which are available to vend products, for a particular product that the user is attempting to locate.

The system may be state, country and even world-wide, ordering devices being controlled by local host processors, the local host processors being controlled by regional

hosts and perhaps even a powerful host processor for controlling the devices world-wide. Because the devices are individually addressable this provides an incredibly powerful system for providing retail information to the device outlets (and any other information), and also obtaining information from the device outlets, which information can be collated and processed by a master host at a remote location.

Such a system is able to collect information that can be useful for marketing, particularly statistical information and information on amounts of various products which are being purchased by the system, information on characteristics of people or organisations purchasing products, their consumption rates, etc. All of this information can be stored on a user database which can be accessed by a host processor for collation, and the provision of useful information for marketing and operation of the system. Each device or apparatus in effect acts as a "marketing laboratory".

Each ordering apparatus preferably comprises a display means, and advertising information may be down loaded from a host processor to the display means, or may be broadcast locally at the apparatus from a memory.

The apparatus and system can be used to collect real time information relating to consumer response to a marketing campaign, for example, which may include all the elements of a conventional marketing campaign, such as pricing, product promotion, advertising, etc.

Preferably, ordering apparatus in accordance with the present invention are provided with a proximity sensor or sensors that detect when someone enters the space in front of the machine. The proximity sensor may preferably serve two purposes; one to change the machines behaviour from attract mode to operational mode (in attract mode an attract display message may be played and in operational mode the device will enable the user to make product

orders). Preferably, a control means of each apparatus has the ability to count how many consumers approached the machine (activate proximity sensor), how many touch the screen (activate touch screen) how many select a product and how many actually purchase a product.

Preferably, the apparatus also includes a card reader which enables a person to enter credit card details or the like, or driving license details, so that information on the identity of the person can be obtained by the apparatus.

Preferably, the ordering apparatus is arranged to provide an option for the user to enter survey information about themselves or about their interests, perhaps by presenting a display screen asking various questions. Answers to these questions may be stored on a database in the apparatus, which may be transmitted via the communications network to a host. This provides yet further information on customers and users of the system.

In a further embodiment, an apparatus may include a smart card reader/writer and may be able to write captured user information on a user smart card so that other devices in the system can interact more intelligently with consumers and respond to their specific needs, present them promotional and cross selling offers specific to their needs, etc.

One of the most popular methods of promoting products, or ensuring product loyalty, is to run a coupon redemption system or the like, by means of which a customer is accorded a reward for purchasing a particular product. The reward may be in the form of a discount from a subsequent purchase, to incent repeat purchases or may be generally any type of reward, offer of a prize in a competition, etc. Such coupon redemption schemes generally need to be administered by human operatives in any retailing system in order to effect the reward, ensure the "coupon" is not forged, etc. By "coupon" we are not limited to a paper

coupon or the like, but generally mean any means by which a reward can be affected for a product purchase or associated with a product purchase.

From a further aspect, the present invention provides a product ordering apparatus, comprising a control means for controlling ordering of products, input means by which a user may select products, and coupon receiving means for receiving a coupon for designating a reward or the like to the user, a means to invalidate the coupon so that it cannot be reused and means for determining and effecting the reward.

Preferably, the apparatus may also include means for generating a coupon in response to user operation of the apparatus.

The "coupon" may include a smart-card, bar code, magnetic card, and any other item by which marketing promotions and the like may be implemented.

The arrangement therefore preferably provides an automatic coupon redemption scheme. One which can be ordered over a communications network, or within a system as disclosed above, and may be associated with rewards redeemed by operation of the coupon receiving means. There is no need for the interaction of a human being.

Marketing campaigns applying such automated coupon redemption schemes can be organised from a host processor.

The apparatus may include combined vending and electronic ordering facilities, may comprise a kiosk which merely has an electronic ordering facility, may be a PC based device which can be operated from the users home, etc.

In one embodiment of a coupon redemption scheme in accordance with the present invention, a smart card may be mailed out in association with a marketing promotion, the smart card being redeemable at an apparatus in accordance with the present invention. Where a smart card or other type of re-writable memory is used, the apparatus can

preferably write to the smart-card and extinguish the purchase offer (it is effectively redeemed), and can then write a subsequent offer to the same card for a further reward associated with purchase of a further product.

The present invention further provides, in an automated retailing system comprising a plurality of electronic ordering apparatus having coupon receiving means for receiving a coupon and means for generating a reward in response to receipt of the coupon, a method for encouraging repeat purchases of products which comprises the steps of generating coupons to users of the system for redemption by the users by operation of the coupon receiving means of the apparatus.

The previous aspects of the present invention relate to retailing which requires electronic or the like devices for generating remote ordering, and may include combined vending and electronic ordering devices, kiosks, PC's and the like, which are preferably connected via a communications network to enable transmission of remote orders. Such systems have been previously described in co-applicants earlier patent applications, absent the improvements discussed above.

As far as conventional retailing is concerned, however, this generally still occurs in the traditional manner. That is, retail outlets such as department stores, shops, etc., are provided where a person attends, is served by a store operator, is provided with product from shelves by the store operator or is able to take it themselves, and pay at a check out or till.

A number of problems are associated with conventional retailing operations. In particular, in many cases a retailer will purchase product from a wholesaler. When stock runs down, the retailer themselves must take action to purchase further product from the wholesaler. In order to ensure that stock is always available on the shelves it is often the case that retailers will have their own

warehouses, sometimes attached to the retail store, where spare stock is kept. This type of system involves the retailer in substantial effort in purchasing product and maintaining warehouse facilities, and also in substantial investment in maintaining quantities of stock for significant time periods before it is sold.

The present invention further provides a retail shelf apparatus, which includes mounting means for mounting product for sale to a customer, sensor means for obtaining information about product associated with the apparatus, and communications means for communicating with a host controller for controlling and monitoring the shelf apparatus.

The sensor means may determine when product items are taken from the apparatus or on a regular basis check the stock status of product items. The sensor means may also be able to obtain information on characteristic of product items and provide that information to a host control.

The sensor means may be arranged to determine when a particular product type drops to a certain level of units. The host controller may then be able to generate a message that stock is low for a particular product and generate an order for a re-stockist to attend the retail shelf to restock that particular product. In such an embodiment, the sensor means does not need to detect every single unit of product being removed, but only a product which is in a place on the shelf which perhaps indicates that other product must have been taken and therefore the stock of that product is low. The sensor means may, however, record every product which is taken from the shelf apparatus. The sensor means may also be arranged to generate an "out of stock" alarm when the last product is taken.

A merchant or wholesaler may therefore control a system which comprises the host controller and retail shelf apparatus, and, without the intervention of a retailer, may control restocking of the shelf, as they will be alerted to

the fact that stock is running out, by the sensor means. This is highly advantageous for the retailer, who may no longer have the responsibility maintaining stock. Alternatively, a retailer could control the system and would be in a good position to order stock when they receive warning from the host controller that stock of a particular product is low.

Where a specialist re-stockist, merchant or wholesaler controls the system, one can envisage that the retailer would merely act as a retail location, and would also take payment of a product.

This automated system dispenses with the need for a warehouse where the retailer stores product.

A system in accordance with the present invention preferably comprises a host controller and a plurality of retail shelf apparatuses discussed above. The host controller will generally be mounted at a remote location.

The communication means may be an electronic network but could generally be any communications media.

The present invention further provides a method of retailing, comprising the steps of providing a plurality of retailing shelve apparatus including means for supporting product for sale to a customer, sensor means for obtaining information about product associated with the retail shelf apparatus, and communication means for connecting to a host processor for controlling and monitoring the shelf apparatus, detecting when stock of a particular type of product is low, and alerting a re-stockist to attend at the retail shelf location and restock the retail shelf with the low stock product.

The retail shelf apparatus in accordance with the present invention and a system for retailing, including a plurality of retail shelf apparatus in accordance with the present invention and a host controller, may include any or all of the features of the electronic ordering system discussed above, along with the retail shelf apparatus.

The entire system may be controlled by the same host controller. Thus, the combined vending and electronic ordering devices may be included in the same automated retailing system with the retail shelf apparatus. Electronic ordering kiosks may be included with the retail shelf apparatus. Alternatively or additionally, stand alone displays may be included with the retail apparatus which have means for presenting advertising or marketing information or the like, and which information may be down loaded from the host controller. Coupon redemption systems may also be installed. A user may log onto a device on one part of the network to see if a required product is located on a retail shelf, before attending at the retail shelf.

In one preferred embodiment, the host system can down load pricing information to a checkout associated with the retail shelf apparatus in the retail store. That is, the price of products on the retail shelf may be alterable from the host controller. The host controller may be the same system that controls the database of prices charged at the checkout. Marketing and advertising promotions may thus be carried out from a central location, price adjustments may be controlled, etc. A further feature of the system is the ability for the retail shelf apparatus to display price and other information electronically via LCD or other display.

Features and advantages of the present invention will become apparent from the following description of embodiments thereof, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a schematic block diagram of a device and system in accordance with an embodiment of the present invention;

Figure 2 is a front elevation of a device in accordance with an embodiment of the present invention schematically indicating hardware components;

Figure 3 is a flow chart illustrating example operation of a device in accordance with the present

invention;

Figure 4 illustrates a retailing system in accordance with an embodiment of the present invention which may incorporate the devices of figures 1 and 2 and also other electronic ordering devices and intelligent retail shelving apparatus;

Figure 5 illustrates a distributed host network that supports the "grouping" structure of an apparatus and system in accordance with an embodiment of the present invention;

Figure 6 is a view of intelligent retail shelving apparatus in accordance with an embodiment of the present invention;

Figure 7 is a diagram illustrating operation of an intelligent retailing system in accordance with an embodiment of the present invention;

Figure 8 is a diagram of an architecture of an ordering apparatus or a delivery device in accordance with an embodiment of the present invention; and

Figure 9 is a diagram of architecture for a host controller in accordance with an embodiment of the present invention.

Referring to Figure 1, a "one stop shop" remote ordering apparatus or device 100 is illustrated schematically in block form. The device is arranged to enable a user to purchase a product which may be vended on site or which may be ordered from a host 101 to which the device 101 is connectable by a communications 102 (which may be a telephone connection, for example, a dedicated line, or other type of network connection, such as the Internet), for later delivery. The device also enables the user to enter and purchase information or goods (eg from a connection 105 to the Internet 106) and is operable without cash. Instead the users credit may be checked by connection 104 to a bank network 103 (eg EFT). The device 100 can also receive external communications via the Internet 106

or the host 101 to reserve stock for collection by a specified user or to enquire upon current levels of stock available.

Host 101 and remote ordering device 100 together comprise a remote ordering/vending system.

The device may be positioned at any convenient location, in a store, an office, an office foyer, a factory, a shopping centre, on a street corner, for example, to enable multiple users access to the automated "one stop shop" facility offered by the device and system.

The remote ordering device 100 includes a control means 110, which comprises a computer for controlling local operation of the device. The computer includes appropriate software for controlling the device. The device 100 further comprises a card reader 111 for identifying a user by means of magnetic card swipe and for use for obtaining account details for a payment processing transaction; a data entry means 112, which may comprise any means for entering data, such as a keypad, audio interface for digitising voice, a printer 113; a video display 114 (which in this embodiment is a touch-screen and therefore also operates as a data entry means 112); a database 115, which may contain product information, information on users etc., (in this embodiment the database 115 is in memory in the device 100, and will in fact be stored in the computers memory where the control means 110 comprises a computer, but the database 115 or part of the database, such as user information, for example, may be stored off-site, at the host device 101, for example, and the device 100 may have access to the database, with only an amount of the database that is required for immediate use of the device 100 being maintained on site); a storage and dispensing means 116 for storing and dispensing product locally on site; a product identification means 117 arranged to identify an article so that a product associated with the article can be determined. The article may be a bar code, magnetic card,

an object, a returned product etc.; and a communications means 118 for interfacing with communications connection to the host 101, bank network 104, Internet 106 and any other required connection.

Other devices 200, 300, 400 may be connected in the system to the host 101. These devices may be the same and offer the same functions as the device 100 or may offer varying functions. For example they may offer different types of products. One or more devices may not offer a vending facility, but will offer an electronic ordering facility. Various types of vending and storage devices can be connected including devices that have unique compartments combined with the ability to record who accessed the particular compartment and when, other devices can be arranged to dispense one or more products from a chamber or rack containing many products.

The device may in one embodiment be a simple PC based device which does not provide a vending facility, and allows a user to order services/goods over the Internet, for example, from the host or from any other retail site available over the Internet.

Figure 2 is a front view of a device in accordance with figure 1, illustrating the hardware configuration. Preferably, the hardware comprises the following components, reference numerals included in brackets indicate how the components relate to functional blocks of figure 1.

A magnetic card reader 210a (card reader 111) is provided for user identification. Note that a smart card reader or the like may be provided in the alternative or in addition to the card reader 210A. A VDU (visual display unit) 210 (display 114), is provided to provide information to the user relating to operation of the device. In the preferred embodiment, a colour monitor 210 has a touch-screen facility so that the data entry means 112 also comprises a touch-screen input. This facilitates

interaction with the customer. A customised pin pad 208 and interface buttons 208a are also provided in the illustrated embodiment, but all the functionality of the pin pad 208 and button 208A may be replaced by the touch-screen 210 in other embodiments and the pin pad 208 and buttons 208a may be dispensed with.

Storage means are provided in the form of compartments 201 (116), each having a separately lockable door (116). It will be appreciated that the storage means could have many other configuration (see applicants earlier PCT application PCT/AU93/00416). In this embodiment each compartment 201 door includes a latch which is controllable by the control means 110 to release the door so that it can be opened so that a user can take a product stored therein or replace a returned product in the compartment and then shut the door. An appropriate mechanism for retaining and opening the doors is described in PCT/AU93/00416, and will not be described any further here. Further, other types of storage means may be provided than compartments with doors, although these are the preferred storage means. For example, a product may be delivered by way of a chute (see earlier PCT application PCT/AU93/00416) from a stack of products. The device also mounts a computer module 220 (control means 110). The computer module 220 is inside the cabinet and inaccessible to the user except via the user input means. Components of the computer module 220 are schematically illustrated. A person skilled in the art will be able to realise an appropriate configuration of the computer module 220 components from this description. Computer module 220 comprises an INTEL based "pentium" processor 221; a 33,300 baud external modem 222 (communication means 118) for communication with the host device 300; 420 to 2200 MB hard disc drive 223, 3.5 inch floppy diskette drive and CDROM 224 and 4 to 64 megabyte of RAM 225, constituting a memory for the computer 220. A sound card 226 for the reproduction of audio files is

provided. A suitable audio means is provided to reproduce sound including a speaker (not shown in the drawing). A video capability such as MPEG or quicktime for video images is also provided. An input and output controller card 227 is provided for receiving signals indicative of products being removed from and placed in the compartments 201 (disclosure of detectors for detecting the opening of a compartment door and the placing of a product therein or removal of a product therefrom are disclosed in the above-mentioned PCT application, which is published and incorporated herein by reference and no further description will be given herein). The input and output controller card 227 detects whether a product is returned or removed from a compartment and provides appropriate signals to the processor 221. Alternatively, products can be stored in chambers or racks and dispensed into an output bin for collection by the user. A receipt printer 228 (221) is also provided for printing user receipts.

The keypad 208, 208A, may be any convenient type of keypad which will enable a user to carry out operation of the device in accordance with the following description. Generally, it will comprise numeric keys 0 to 9, scroll keys, to enable scrolling of a display appearing on the screen 210 and selection keys 208A to make a selection of a particular item appearing on the screen next to the particular key 208A. As discussed above, where a touch-screen interface is provided, as it is in the preferred embodiment, some keys may not be necessary or the keyboard may even be dispensed with entirely. It may also include alphanumeric keys for the input of more complex instructions, although more complex instruction input may preferably be handled by touch screen.

A bar code scanner 229 is also provided for scanning bar codes to identify products, (product identification means 117).

The device also includes a proximity detector 240, which may be a camera, for example, and may also be an infra-red detector or the like. Both a proximity sensor and a camera can be incorporated so that when the proximity sensor detects a person in the space of the machine, the camera is turned on to record the consumer. The proximity detector is connected to the control means for detection of approach of a user to the apparatus. The device also includes a means for issuing a reward 241 which may be in the form of a printer for a bar code, or may be arranged to issue a smart card, magnetic card or the like which can be used for redemption of a reward during a subsequent purchase from the ordering apparatus or like ordering apparatus in the system. The reward issuing means 241 may also be arranged to issue a PIN number or other identification means for securing reserved stock which a user has reserved either in a particular ordering apparatus they are using or at another ordering apparatus in the system.

It will be appreciated that much of the control of the device will be implemented in software, for control of operation of the hardware of the device in accordance with this embodiment. A detailed description of the software configuration is not necessary. The functionality of this device may be software implemented in any number of ways, using standard software tools available to the skilled software engineer. This description describes functional requirements for the device and is sufficient to enable a skilled person to implement appropriate software.

An example of operation of the device will now be described generally with reference to figure 3.

The control means 110 is adapted to control the display means 114 to produce a number of screens, depending upon user operation of the device 100. As an initial step, an "introduction screen" 801 is displayed by display means 114. The introduction screen may give information to the

user as to how to access the device, e.g., where to place his identification means in order to proceed with a transaction.

After reviewing the introduction screen 801, the user proceeds to step 802 and inserts his magnetic card into card reader 210A, to enable the device to identify him.

After the user has been identified 803, the control means 110 controls the display to display a "main menu" 804. This may comprise a single screen or, alternatively, a number of screens through which the user may scroll, providing the user with a number of choices of goods/services available for order, and may indicate whether goods are "on-site" in storage locations 201 or only available from remote site. Alternatively, this indication may not be given until later on in operation of the device. The display means may provide high definition graphical images of catalogue products (depending on software).

An example of electronic catalogue menus are described in applicant's previous applications and no further description will be given here.

In the next step 805, the user selects the product he requires (either goods/services or both) by actuation of the input means 112 (which is a touch-screen in the preferred embodiment).

The user may then be required to pay by means of the bank network 104, securing the payment transaction via credit card or bank card swiped in the card reader 210A. Note that the bank card or credit card may provide sufficient identification to the system and a separate identification magnetic card may not be required. Note that a payment transaction is not necessary. It is possible that a separate billing process could take place, as long as identification of the user has been made.

If the product is available locally, in the next step 807 the product is dispensed from one of the storage

locations 201, the control unit operating a latch mechanism to the particular storage location 201 to enable the user to open the specified door. The user then takes the product. A suitable latch mechanism and configuration of the storage location is described in the earlier PCT application referred to above (PCT/AU93/00416).

The preferred embodiment incorporates a recycling function as well as a vending function (see earlier PCT application). It enables the user to recycle complex items, such as toner cartridges for laser printers, etc. Step 808 enables a user to return a used product to an appropriate storage location 201 for recycling. Damaged and unwanted goods may also be returned. This option need not be included, but is preferred. At step 809, a receipt is printed and provided through slot 228 to the user. The receipt gives details of the user transaction for his information.

If the result of the decision at step 806 is that a product is not available locally, at step 810 the display requires the user to indicate whether his order is confirmed. If the order is confirmed the control unit requests the order from the host device by way of communications link 102, at step 811.

Alternatively, if the product is ordered over the Internet, then the order will be placed with the web server of the Internet provider.

At step 812 receipt is printed for the user through slot 211, giving details of the delivery.

Details of user account transactions are periodically up-loaded to the host device 101 via the communications link 102 (step 813) to assist in administration of the system (814).

The device may include many other features as already previously described in applicant's earlier applications, and no further description will be given here.

Figure 4 illustrates a novel retailing system which can incorporate devices as described above, as well as other devices, such as PC's, in an area, nationwide or country wide retailing network.

The system illustrated in figure 4 comprises a host computer 1 and a plurality of remote ordering devices 2, 3 and 4. By using the remote ordering devices 2, 3 and 4, a user is able order goods/services from goods/services providers 6, 7.

Goods/services providers 6 may be any supplier of any goods/services e.g., office consumables, food, drink, and generally anything that may be purchased or provided.

The host 1 is arranged to co-ordinate the processing and delivery of orders, and is also arranged to process transactions, e.g., records of payment for orders, etc, as discussed above in relation to Figures 1 and 2. In the preferred embodiment, all communications and orders from the remote ordering devices 2, 3, 4 are routed via the communications medium 10, 7 via the host 1 to the goods/service providers 6. In other embodiments, however, orders from the devices 2, 3, 4 may be routed via communications 10, 7 directly through to the providers 6, but information on the transaction will still be sent to the host 1 so that the host 1 can co-ordinate transactions, deal with payments to the service providers and other users, etc. The host 1 may include all features described above in relation to the previous embodiments. The remote ordering devices 2 may include remote ordering devices 100 as described above, having any or all of the features as described above.

The system also includes vending machines 11 able to communicate to the host by communications means 10, 7. The vending machines stock goods/services on site locally. A user can obtain the goods from the vending machine. The host will be advised of stock in the goods and can communicate with re-stockist 12 who can attend the vending

machines 11 and re-stock. The vending machines may not include a remote ordering facility, but only a vending facility.

Note that service provider 6, 7 may also include independent Internet service providers who can provide access to the Internet for obtaining information services from the Internet, by devices 2, 3, 4.

The vending machines may comprise vending/recycling machines as disclosed in applicant patent application number PCT/AU93/00416. In such a case the machine is arranged to provide information on goods returned for recycling so that the host can coordinate transactions involving recycling. The system may also include remote ordering devices of the following different types.

1. An electronic ordering device comprising a personal computer based device, and an ordering means which runs on the PC and enables communication with the host and provides information on goods/services to be ordered.
2. An electronic ordering device may comprise a PC which has access to the Internet, and an ordering means as provided on the Internet in the form of a web page provided by a web server. The web page provides information on goods/services to be ordered and also enables communication with the host for the goods/service orders to be filled.
3. An electronic ordering device may comprise a dedicated ordering kiosk (such as described above in relation to the previous embodiments) including an ordering means for communicating with the host or means for communicating with an appropriate web page on the Internet. Such ordering kiosks may be adapted to be placed in public places.

In one embodiment, as described above, the ordering means comprises a combination of software and hardware which includes a product database and communication means

for communicating orders from the remote ordering device to the host device. Parts of the ordering means may be provided on the remote ordering device and other elements at the host device. It is common, for example, in some cases the product database may be provided actually in memory at the remote ordering device and in other cases it may be provided by on line access to the host, the product database being stored in the host memory. Alternatively, the entire product database may be made up by a mixture of the database at the device and the database at the host.

Alternatively, the ordering means may be a separate entity which is available for access on the network. For example, it may be provided at the host by on-line communications, or it may be provided as a web page on the Internet to enable access by standard PC's, local area networks, devices such as described above which do not include an on-board ordering means, etc.

The network may also include intelligent retail shelf apparatus 16, as illustrated. This has already been discussed in the preamble and will be described in more detail later. The host can thus control an entire range of devices over a communications network and monitor and control orders taken from those devices, restocking, obtaining customer information, etc.

Devices such as the apparatus of figure 1 provide a excellent facility for presenting information to a consumer via the display, voice, etc. Further, the ability to share information over a network with a host controller enables sharing of information between ordering apparatus connected to the network, and the presentation of marketing, advertising and other promotional-type campaigns which can be controlled from a central location via a host.

In one embodiment of the ordering apparatus, sensor means 130 (figure 1) is provided which can determine when a product is removed from the apparatus, when a product is restocked in the apparatus, characteristics of the product

(e.g., shape, etc as already discussed in the preamble of the specification) or when stock is out. This information can be stored in a database and can be shared via the host and the communications network between devices able to communicate with the network. All this information can be stored in database 115 and/or may be accessible on-line from a main database stored at a host. Means are provided for accessing this information such that a person can inquire on a PC connected to the network, on an ordering apparatus connected to the network, or on any of the other devices discussed above, as to the availability of a particular product, its location, its characteristics, how long it has been in stock, etc. A user can also attend a vending or intelligent retail shelf facility and ascertain characteristics of products stored within the vending retail facility, or stored at other vending retail facilities.

The types of sensors used can be any type and some have been described in applicants earlier PCT applications referenced above.

Further, this information can also be utilised by a re-stockist. The re-stockist will be made aware by transmission of information on removal of stock from a device, or via a low stock sensor when stock is low.

The communication system between the device and the re-stockist whether direct communication or via the host can generate a restocking report of the re-stockist that advises the re-stockist what quantities and what products to courier to the device to return the device to its optimum stock levels. This facilitates a "Just in Time" restocking facility for vending machines and retail outlets, that reduces the amount of inventory required to service customer needs.

The sensors may include bar codes or other types of identification means, e.g., magnetic strip, optical marking, conductive contacts, physical characteristics,

etc. The information included or referenced in the database may be the date of the product, expiry date of the product, etc., to assist in control and stocking. Such information will also assist a user in deciding whether or not they wish to purchase the product. Such information may also indicate whether or not a product is compatible with a particular device.

The information about a product may also include logic based information stored or processed by the control means 110 in response to operation of the various apparatus in the network.

Information may also relate to the actual location of a product within the device or a device e.g., which chamber or shelf, in the delivery chute, in the output bin, etc.

Other information which might be obtained is listed in the preamble of the specification.

The information may be provided over any communications media or any network facility, providing an extremely powerful arrangement for accessing information about products which may be state, country, or even worldwide. Because information is also available on the compatibility of a product with any particular device or with other products, it may also be included, a user can do a "search" to locate a vending machine, intelligent retail shelving, etc., stocking product.

Retailing shelving apparatus as will be described later may also include means for determining information about products stored on the retail shelving apparatus and this may be communicated to a network such as discussed above. A user "logging" on at a PC or any other of the ordering apparatus may therefore establish location of product on intelligent retail shelf apparatus. Similarly a stockist may monitor the retail shelf apparatus as well, from a remote device.

A facility is available at ordering apparatus and may be available at appropriately configured PC based

apparatus, which enables a user to make an inquiry regarding the location of various vending outlets and intelligent retail shelves in their particular area. The location of these outlets may be displayed on a locality map on the display means of the ordering apparatus the user is accessing. The map may also include a graphical display of available product at each vending outlet, or where the user requires a particular product, may indicate which outlet has that product. Means may also be provided for a user to access a particular vending outlet or intelligent retail shelf apparatus via the communications network, to find out exactly what products are stored at the particular outlet.

The user may therefore access an outlet at any locality, as long as the outlet is connectable in the communications network, "log on" to that outlet and find out details of characteristics of product available at that outlet.

Browser means may also be provided to enable a user to access the Internet and browse on the Internet from an ordering apparatus or PC associated with a system in accordance with the present invention. Further, web sites may be set up by merchants in relation to the present system and may include a means for alerting a browser of the existence of a particular product at a particular location. The means for alerting the browser may also include a means for enabling the user to order the product.

Further, means are provided for reserving product which is available outlets where the dispensing of products is controlled, remotely from an ordering apparatus or a PC based device being accessed by a user. In order to secure the stock, reserve issue means may also be provided for issuing an identification means such as a PIN number, bar code, E-mail address and password, or the like which the user can carry to the outlet where the reserved product is available, to release the reserved product to them. In the

meantime, the particular reserved product will not be released without the pin code being input or the bar code being scanned. Other items may be used for enabling release of a secured and reserved product, such as magnetic cards, smart cards, etc. Reward issuing means 241 (figure 1) may be arranged to issue such items in response to a reservation made on that machine or even made on a PC within the locality of the ordering apparatus 100.

As discussed in the preamble of this specification, each of the ordering apparatus which are connected via the network are individually addressable from the host processor. The addressable apparatus may include PC's which incorporate ordering means for enabling products to be ordered on the network, dedicated ordering apparatus such as stand alone kiosks, combined ordering and vending apparatus and generally any other types of devices as discussed above in relation to figure 4. Logic means are also provided for selecting devices by address, location, and generally any characteristic, also as discussed in the preamble of the specification.

An example of a distributed host system architecture that supports the grouping structure for the address able devices in the system is indicated in figure 5. Local ordering apparatus which may also provide a vending function are indicated by reference numerals 100. They are situated at the base of a tree like hierarchy. A local operator 100A acts as a local host for devices 100 in a local region (e.g., town, city, etc). Above the local operator in the hierarchy is a regional host 100B for controlling the local operators 100A and, receiving information from the local operators 100A and via the local operators 100A, the ordering devices 100. Information can be transmitted from a local operator 100A to multiple hosts at the next hierarchal level e.g. 100B and 100D. Alternatively, devices 100 could all communicate via communication means to a central global host 100C and the

global host 100C can select groups of devices 100 to download information or to extract information for analysis. The regional host 100B may control all the devices in a state, or country, for example. At the peak of the hierarchy is a global host 100C which is able to control all the devices 100 in the system, obtain information from all the devices in the system and provide information to all the devices in the system. The system may include any type of devices, as already described in relation to figure 4.

The arrangement may also include a regional re-stockist 100D which is a separate host-type device which can be used by a re-stockist to maintain stock in the devices 100. It can also be used by a distributor to service orders which are made remotely, i.e., not to restock product in a vending outlet but actually deliver ordered product to a consumer.

This type of arrangement is very powerful. Data can be exchanged between all the devices in the system. As discussed in the preamble of the specification, an advertising, marketing or promotional campaign can thus be organised centrally and used to control any one or more of the addressable devices in the system. A particular marketing campaign may therefore be restricted to a particular group of devices, in a particular town, area or city, for example; a "group" of devices in a location where the population has a particular demography, for example, etc. The database at the Host allows any number of groups to be set-up and devices 100 can be assigned to any group which they may belong in. There is a scope for an infinite number of group to be established.

AND/OR logic is provided in software which enables access and control of all devices by group. For example, if the price of a particular product in a group of devices 100 is required to be updated, it can be done separately from other devices in the system, merely by separately

addressing those devices. For example, all the machines at a particular university could have their products priced separately from machines elsewhere in the system. The pricing information can be updated from the host processor. Groups of machines can be set up with various characteristics, and can be nested within each other.

Information can also be provided to users on various "groups" of apparatus, as discussed above.

Another powerful feature of the system in accordance with the present invention is the ability to collect statistical information about the behaviour of consumers.

As discussed in the preamble, statistical information on how many consumers approach the machine, touch the screen, select a product and purchase a product can be obtained by each ordering apparatus, particularly where the ordering apparatus has a proximity sensor 240 (useful for detecting approach of a customer to a machine). This information can be used to control marketing and promotions and using the "grouping" ability of the system promotions and marketing can be carefully controlled and targeted.

This statistical information gathering facility can be enhanced by providing means for asking questions of the user at various ordering apparatus or PC related devices, such that the user will enter survey information which can be collated and stored in a database, for use in marketing, promotions and operation of the devices.

In some cases users may interact with the devices via smart cards as identification cards, and information which has been captured from the user may be written on to their smart cards so that the machines can interact more intelligently with consumers and respond to their specific needs, can present them with promotional and cross selling offers, etc.

It is also possible that other devices such as ATM machines could be included in a communications network to which the present system has access. ATM's could be used

to capture statistics on users, which could then be entered into the system to be used in relation to other devices in the system.

With all this statistical information host processors can construct incredibly powerful databases relating to customer information, operation of in-field devices, etc.

As discussed above, advertising information can be presented on the apparatus, in the form of videos, graphics, sound, etc. To enable advertising and promotional information to be changed from time to time with minimal software complications, a software system has been developed which allows the user interface software or parts of it to be modified, then downloaded to groups of machines, without modifying other parts of the software or without having to visit the devices.

As also discussed in the preamble, a reward or loyalty system may be implemented by the ordering apparatus and system in accordance with the present invention.

Means 241 are provided for producing a reward "coupon" to a user who has identified themselves to the apparatus. The reward may be in the form of a smart card, bar code, or even a PIN number, or generally any item by which a reward can be redeemed, the idea being that the item can be presented to another ordering apparatus or to the same ordering apparatus for a subsequent purchase and the reward can be delivered. Such an automatic coupon redemption scheme will be very effective and easy to administer, particularly with the powerful information gathering capabilities of the system of the present invention.

The ordering apparatus need not issue the reward item, but the reward item could be issued separately by an administrator, for example, in relation to a particular marketing promotion. The reward can be targeted to various demography's, utilising the systems grouping, as discussed above. This is facilitated by the ordering apparatus having the facility to act on the "coupon" to redeem the

reward to the user.

Figures 6 schematically illustrates an intelligent retail shelf apparatus 700 on which product 801 is stored. An optical transmitter 702 and receiver 701 are provided for detecting a stock out situation for product 801. Further, optical sensors 703 are provided at each product 801 location to detect the presence of a product and/or information on the product which will be provided by a bar code, or other similar item which is placed on the base of the product 801 (and is not shown in the drawings).

Further a support 705, for supporting product, is shown which may be associated with a micro switch 706 so that each time a product is removed it is also detected by the micro switch 706. The shelf label 707 which can display information and pricing on the product may be an electronic display (e.g. an LCD) that can have information downloaded from a host.

An alternative embodiment of the smart retail shelf may comprise compartments for the storage of products, where each compartment contains a sensor that detects the removal of a product.

Another embodiment is an inclined gravity fed shute or handing bar that stores the product (where each time that the end (front) product is removed, the remaining products move forward) combined with sensing means to detect low-stock and out of stock conditions.

A further embodiment contains a barcode scanner that moves along a rail when required to scan the type and quantity of product stored in the retail shelf.

The intelligent shelf apparatus can therefore provide information on products which are stored in the apparatus, can provide information on when products are removed, and when products are out of stock or low in stock. Such an apparatus can be connected in a system in accordance with the present invention, as discussed above. A host processor will have access to such an apparatus, therefore,

to determine what product is available, for the purposes of a user who may require the product, and also for a re-stockist who may wish to restock the product.

Figure 7 shows a way in which the smart retail apparatus may be utilised in a management system.

An inventory management master system 750, which may incorporate a host controller in accordance with the system discussed above or may be the local inventory management system at the retail site, separate to the host controller, and being controlled by a re-stockist or manager, is arranged to operate the "smart" shelf 700 at a retail location which may be local or remote from the inventory management master system 750. A smart shelf alerts the master system 750 by way of a communications media (which may be any convenient communications media, including the Internet) with regular stock status reports. The inventory management master system 750 can respond by alerting a re-stockist to restock the shelf 700. Where the inventory management system 750 also manages the retail site operation prices displayed at the smart retail shelf's electronic display tag will be identical to those charged at the checkout counter. This integration also allows sales registered at the checkout counter to be calculated and communicated to the re-stockist. If the smart retail shelves store all of the products at a retail location, then the combination of sensors at the shelf to detect product removal, product low status or product out of stock status, combined with checkout sales data provides a powerful management system. As discussed in the preamble, an advantage of this is that a retailer need not maintain stock in a warehouse at the location of the retail outlet. The intelligent shelf apparatus system may lead to another method of organising retailing, which does not involve the retailer purchasing product. Instead, the stockist may supply the product and receive money from the retailer after the product has been brought by a customer.

A further feature of the system is the ability for manufacturers and distributors to supply products to the retail locations on a consignment basis. The products are owned by the original manufacturer or distributor until sold. The original manufacturer or distributor can own their own retail shelves and/or vending/delivery outlets and pay the re-stockist and retail location on a commission or other basis when sales are made. The host system provides an administration and reporting system to manage consignment inventory, retailer, re-stockist and location commission on an automated basis.

When the customer has purchased products from the shelf 700 he will approach the checkout and pay for the product at the checkout 751. Subsequent payment can be made to the inventory manager. Alternatively, retailing may operate conventionally, but the inventory manager has the ability to react to stock purchase more rapidly than in conventional systems. The checkout system 751 may be connected via a communications link to the inventory management master system 750, and pricing of stock may automatically be updated from the inventory management master system and sales may automatically be reported back to the inventory management master system.

The system of figure 7 may form part of a larger retailing system including vending machines, ordering apparatus, etc., as discussed above. Further, a smart shelf may be associated with a remote ordering apparatus such as discussed above, which can also provide advertising information, marketing, promotions and generally all the facilities discussed previously, to provide an extremely powerful information gathering and providing, retailing system.

Figure 8 discloses an example architecture for the device. The architecture includes IC verify services processing software, for verifying a user payment transaction. The architecture also includes OLE automation

which utilises Microsoft® message passing standard facilitates non-call module removal and replacement. It also includes a user interface which has already been somewhat described above and is described in previous applications, controlling interfacing with the user. A data manager performs all user interface database operations, including interface of security information with the control means 110. An event manager controls processes within the device facilitates changes to process sequences by using a state-transition table. The shopping basket service architecture maintains a customer selected products requests card authorisation, prints receipts and requests that "take now" (vended on site) items be dispensed from the storage and dispensing means 116. The device manager controls interaction with the apparatus peripherals, e.g. the card reader and door sensors and facilitates peripheral removal and replacement. The communication manager connects the apparatus to the host and down loads data from the host to the device and also up loads data from the host to the device. The watch dog monitors the operation of the apparatus and intercepts software, performs error housekeeping, gathers error information and re-boots the system when required.

The software system is structured such that there is an API (Application Programmable Interface) between the user interface and the OLE Automation layer. This allows for third party development of user interface software for vending machines smart retail shelves and kiosks, whilst retaining the same program code for payment processing, hardware device control, communications, shopping basket, etc. The development of an API for the user interface is a particularly relevant feature which allows advertising and marketing programs and promotions to be developed and downloaded to selected devices or groups of devices without the need to modify operation of the core software within the host or devices. The API structure also allows user

interface software to be developed in a way where parts of the user interface are not frequently to be changed, however, parts such as prices, graphics and promotions may be downloaded at any time.

Further, the design of the device software is such that variable information may be drawn or downloaded from the host database. This allows central updating of prices, graphics, product messaging, etc ensuring that all retail outlets (e.g. kiosks, vending machines and retail shelves) are updated with the latest information. Information to be updated can be broadcast out from the host (using E-mail, dial-up to machine or other network download) or alternatively, machines can collect updated information when they dial-in or connect onto the host.

In applications such as marketing of consumables for machines or where cross reference information or tables need to be maintained the design of the system allows such information to be maintained centrally and communicated to sales outlets automatically for example if printer supplies are being offered with a selection means to assist users select the correct supply for their printer and if a new type of media (e.g. photo paper) was being offered for sale at the retail device then the product information for the photographic paper could be loaded into the host system product database (including part number, product description, image file, sales information) along with the printers that the photographic paper is compatible with the printers that the photographic paper is compatible with and if a user using the retail device selection means selects a printer that is cross-referenced to the product item database, then the user will be advised that the photographic paper is a supply item for sale that is compatible with their printer model and they will have immediate access to the product information and order details for the product. Similarly, each of the modules identified can be modified in their own right (e.g. device

manager to support alternative hardware devices, or Communications Manager to support additional alternative communications methods) without the need to modify or re-test the other functional modules within the system. The defined structure of each operating part of the vending machine or kiosk or PC based software even allows for each software module to be written in a different operating language, without affecting operation of other parts of the system. This allows developers of ordering software to create their own shopping basket on a Web server and allow the transaction amount to be passed to the payment processing module for authorisation and the payment processing module can request the user to insert their credit card into the card reader which is controlled by the device manager which reads the credit card information for the payment processing module. All activities are controlled by the event manager with all the information controlled by the data manager and all user interaction controlled through the user interface.

The event manager supervises all activities (events) within the device such as a power failure, an alert, action from a hardware device and scheduled events. The event manager can generate communications with the host by activating the communications manager. Communications can be on a sequenced timed basis (e.g. dial-in to host twice daily at specified times) or on an event basis (e.g. dial-up now as there has been illegal access to inside of the device, or there has been a power failure, or stock low status). The communications manager in the device is a mirror image of the communications manager in the host.

Figure 9 illustrates an architecture of a host device for use with the system of the present invention. The host device may be a global host or a regional host. The device includes a main host database which can obtain and store information from all devices in the system. This host database may be accessed by the devices in the system to

call down information that they may require, for interface with a user of the device. Note that the user interface of each device may be divided into three types, one for a customer, another for a re-stockist and another interface for a technician. These interfaces have previously been described in co-applicants pending application PCT/AU97/00058.

The host database includes any information necessary to running the system, and includes transaction data up loaded from ordering apparatus; configuration and grouping and addressing of ordering apparatus, re-stockist and technician history; alarms and alerts history; product information.

The architecture also includes a database importer which is arranged to import data received from the ordering apparatus into the host database and a database exporter which exports data from the host database in preparation for being down loaded to other devices in the system. Communications are also provided for communicating with the network and a reporting system is provided for providing reports on information contained in the database.

Figure 10 is an example display, showing a map indicating locations of ordering apparatus.

It will be appreciated by persons skilled in the art that numerous variations and/or modifications may be made to the invention as shown in the specific embodiments without departing from the spirit or scope of the invention as broadly described. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive.

CLAIMS:

1. A product ordering apparatus comprising a control means for controlling ordering of products, input means by which a user may select products, and information means for determining and providing information on products available for retail via the apparatus.

2. An apparatus in accordance with claim 1, wherein the information means is preferably arranged to determine and provide information on characteristics and aspects of products which are available for order via the apparatus.

3. A system including a plurality of apparatus in accordance with claim 1, connectable via a communications network to a host device which is arranged to control the plurality of ordering apparatus, obtain information from the plurality of ordering apparatus and provide information to a plurality of ordering apparatus.

4. A system in accordance with claim 3, wherein the information means is arranged to determine and provide information on all characteristics and aspects of products which are available via the apparatus and retailing system.

5. A system in accordance with claim 4, where devices are provided for storing product and these devices include sensor means for providing information on characteristics of the product to the system.

6. A system in accordance with claim 5, wherein the devices include combined vending and ordering apparatus which have an ordering facility and also store product.

7. A system in accordance with claim 5, wherein the device includes a intelligent retail shelf arranged to store product and mounting sensors for obtaining information from product.

8. A system in accordance with claim 3, wherein an ordering apparatus includes means enabling a user to reserve a product which has been located over the system.

9. A system in accordance with claim 8, wherein the ordering apparatus is arranged to provide a security means

to the user to enable release of the reserved product from a delivery device.

10. An ordering apparatus in accordance with claim 1, including means for issuing a coupon for effecting a reward when the coupon is used with the ordering apparatus, a delivery apparatus or another type of apparatus which is arranged to receive the coupon and issue a reward.

11. An apparatus in accordance with claim 1, including the means for receiving a coupon and effecting a reward in return.

12. A retail shelf apparatus, including mounting means for mounting a product for sale to a customer, sensor means for obtaining information about product associated with apparatus, and communication means for communicating with a host controller for controlling and monitoring the shelf apparatus.

13. A method of retailing, comprising the steps of providing a plurality of retailing shelf apparatus including means for supporting product for sale to a customer, sensor means for obtaining information about product associated with a retail shelf apparatus, and communication means for connecting to a host processor for controlling and monitoring the shelf apparatus, detecting when stock of a particular type of product is low, and alerting a re-stockist to attend at the retail shelf location and restock the retail shelf with the low stock product.

14. The product ordering apparatus, comprising a control means for controlling ordering of products, input means by which a user may select products, and coupon receiving means for receiving a coupon for designating a reward of the like to the user, and means for determining and effecting the reward.

15. A product ordering system, comprising a plurality of ordering apparatus which are connectable via a communications network, whereby a user of the system can

access the network, and control means for providing information on available products and enabling the user to order the products.

16. A system in accordance with claim 15, where means are provided to enable the user to reserve stock at any location.

17. An apparatus in accordance with claim 16, wherein a security means is provided to the user which is operable to effect release of the stock.

18. A system in accordance with claim 3, wherein the system is controlled by a control means including software, and the software includes interface means for interfacing with operators and users, the interface means being an application programmable interface.

19. A system in accordance with claim 18, wherein the software enables the provision of cross-reference information, whereby information on a product may be cross-referenced to information on compatible products.

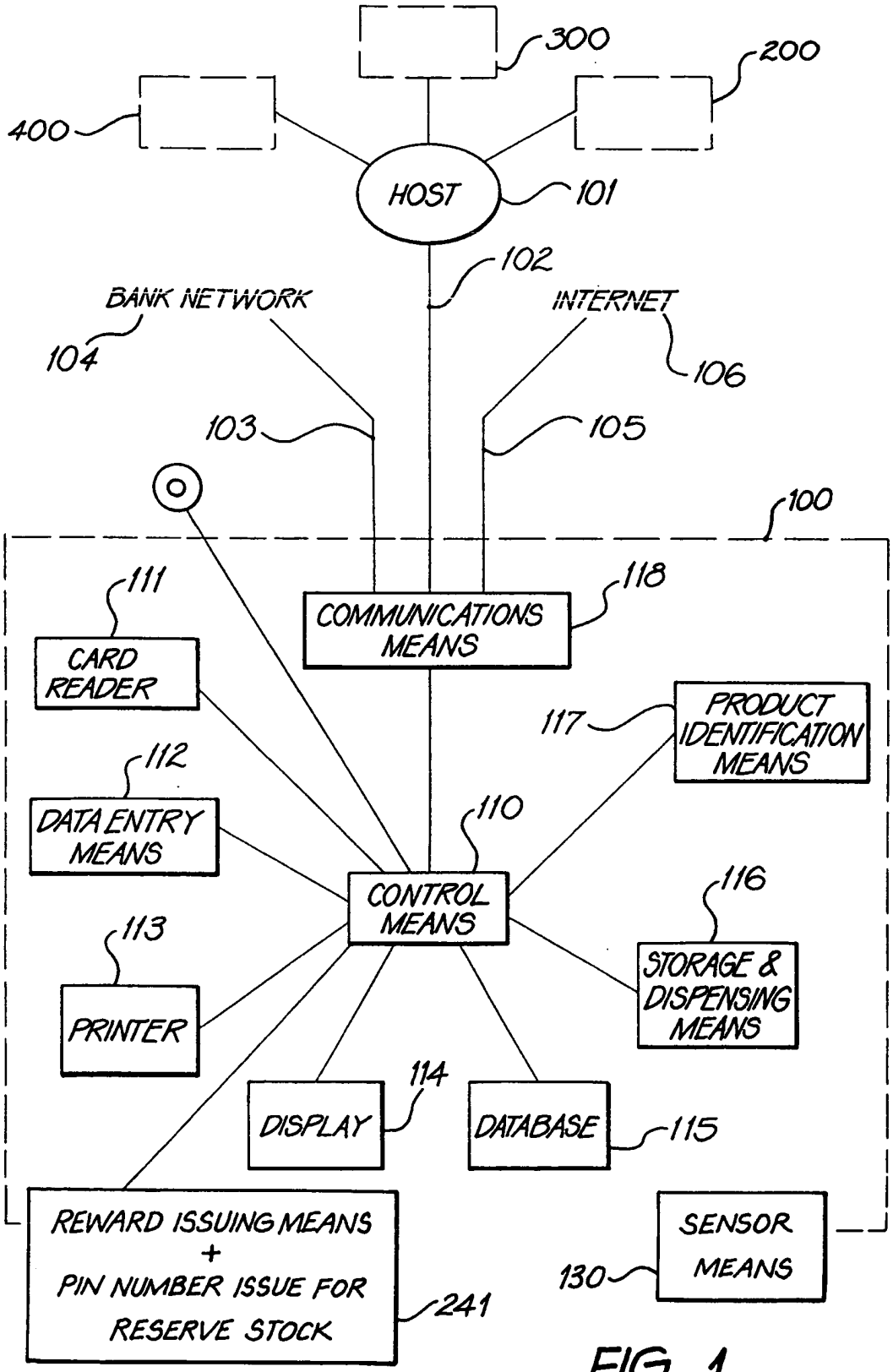

300
200
400
HOST
101
102
BANK NETWORK
104
INTERNET
106
103
105
100
111
118
CARD READER
COMMUNICATIONS MEANS
117
PRODUCT IDENTIFICATION MEANS
112
DATA ENTRY MEANS
110
116
CONTROL MEANS
113
STORAGE & DISPENSING MEANS
PRINTER
114
DISPLAY
DATABASE
115
REWARD ISSUING MEANS + PIN NUMBER ISSUE FOR RESERVE STOCK
241
SENSOR MEANS
130

FIG. 1

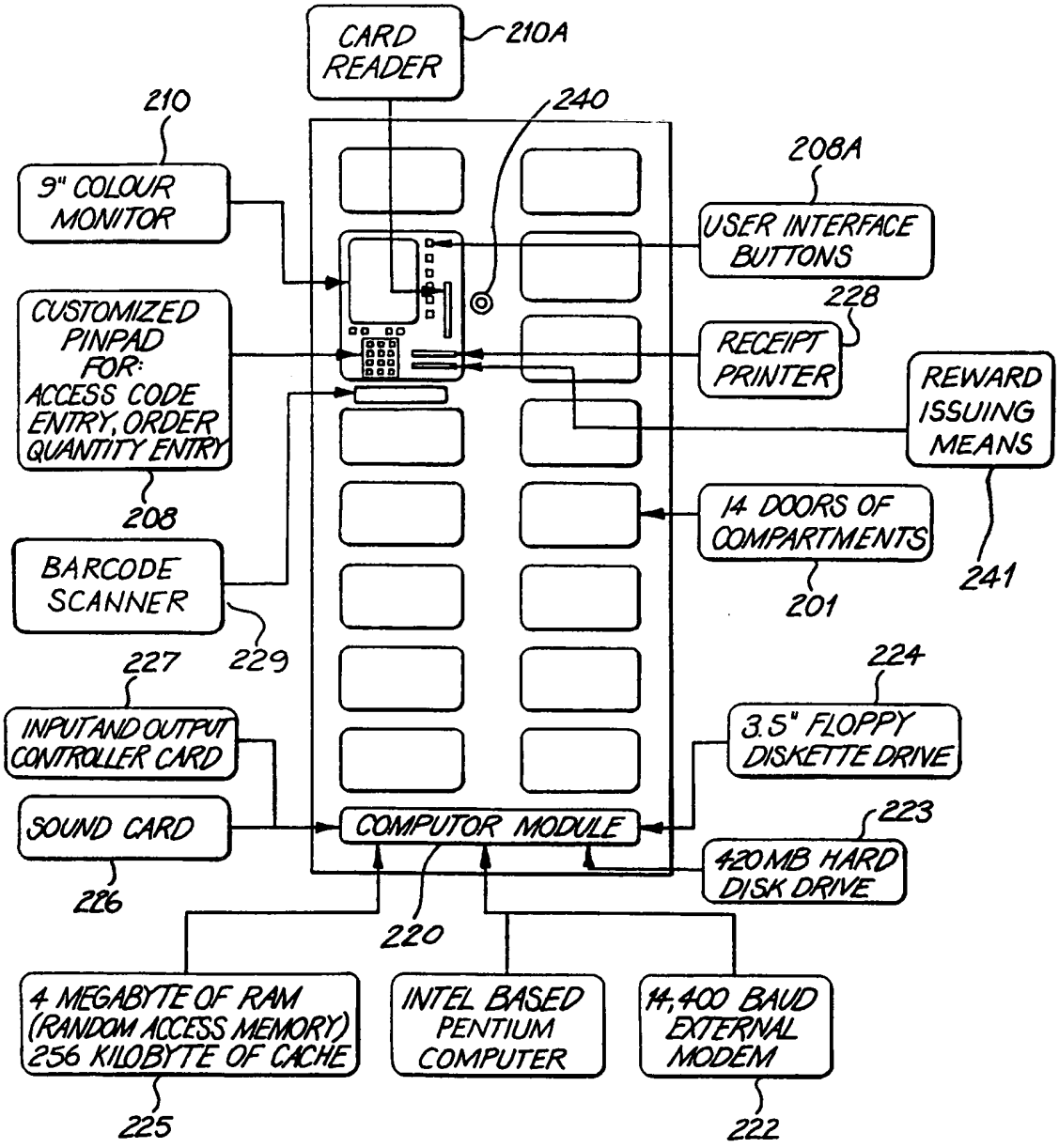
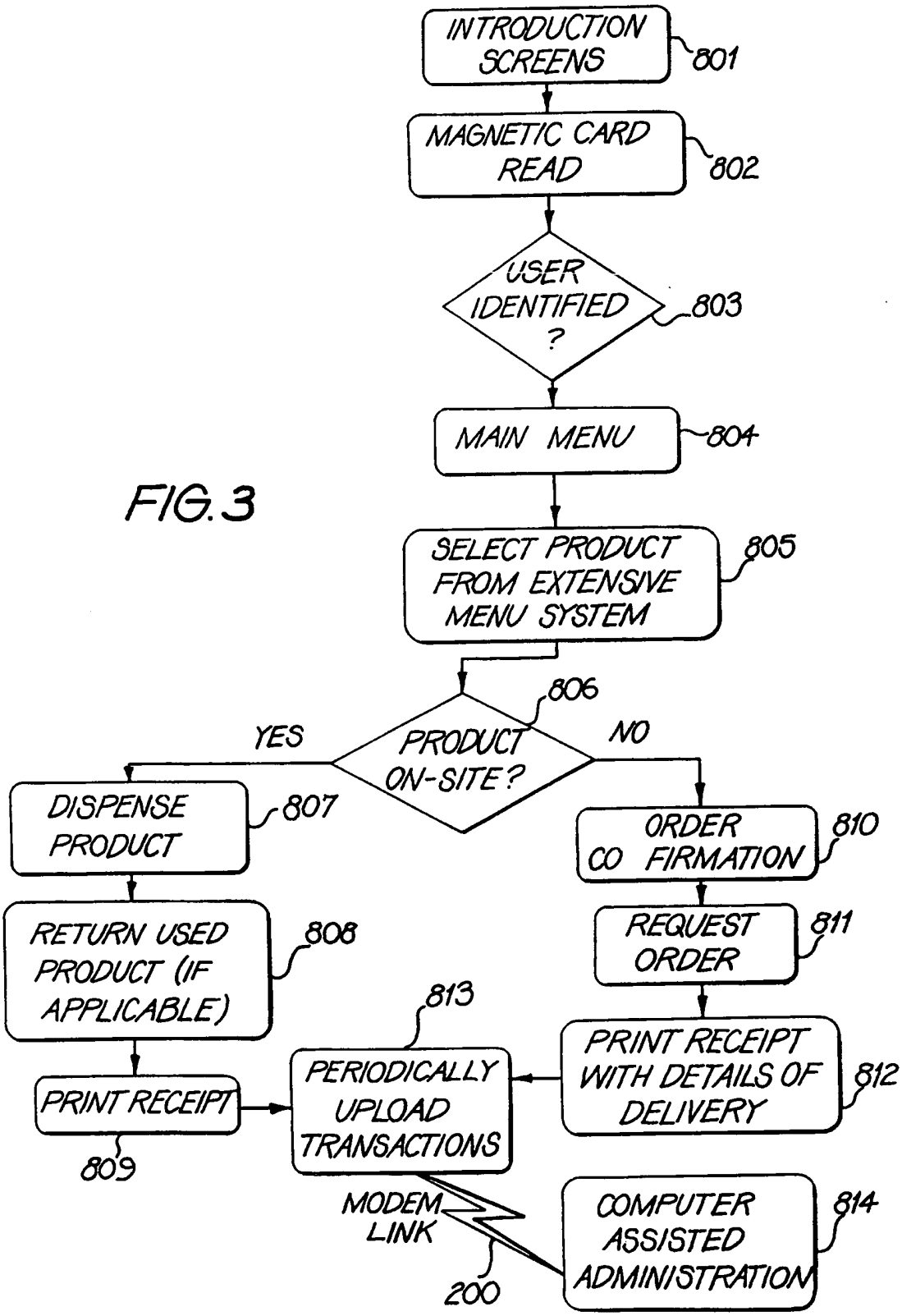

CARD READER
210A
210
240
208A
9" COLOUR MONITOR
USER INTERFACE BUTTONS
228
CUSTOMIZED PINPAD FOR: ACCESS CODE ENTRY, ORDER QUANTITY ENTRY
RECEIPT PRINTER
REWARD ISSUING MEANS
208
14 DOORS OF COMPARTMENTS
241
BARCODE SCANNER
229
201
227
224
INPUT AND OUTPUT CONTROLLER CARD
3.5" FLOPPY DISKETTE DRIVE
SOUND CARD
COMPUTOR MODULE
223
420MB HARD DISK DRIVE
226
220
4 MEGABYTE OF RAM (RANDOM ACCESS MEMORY) 256 KILOBYTE OF CACHE
INTEL BASED PENTIUM COMPUTER
14,400 BAUD EXTERNAL MODEM
225
222

FIG.2

FIG. 3


INTRODUCTION SCREENS
801
MAGNETIC CARD READ
802
USER IDENTIFIED ?
803
MAIN MENU
804
SELECT PRODUCT FROM EXTENSIVE MENU SYSTEM
805
806
PRODUCT ON-SITE?
YES
NO
DISPENSE PRODUCT
807
ORDER CO FIRMATION
810
RETURN USED PRODUCT (IF APPLICABLE)
808
REQUEST ORDER
811
813
PRINT RECEIPT WITH DETAILS OF DELIVERY
812
PRINT RECEIPT
809
PERIODICALLY UPLOAD TRANSACTIONS
MODEM LINK
200
COMPUTER ASSISTED ADMINISTRATION
814

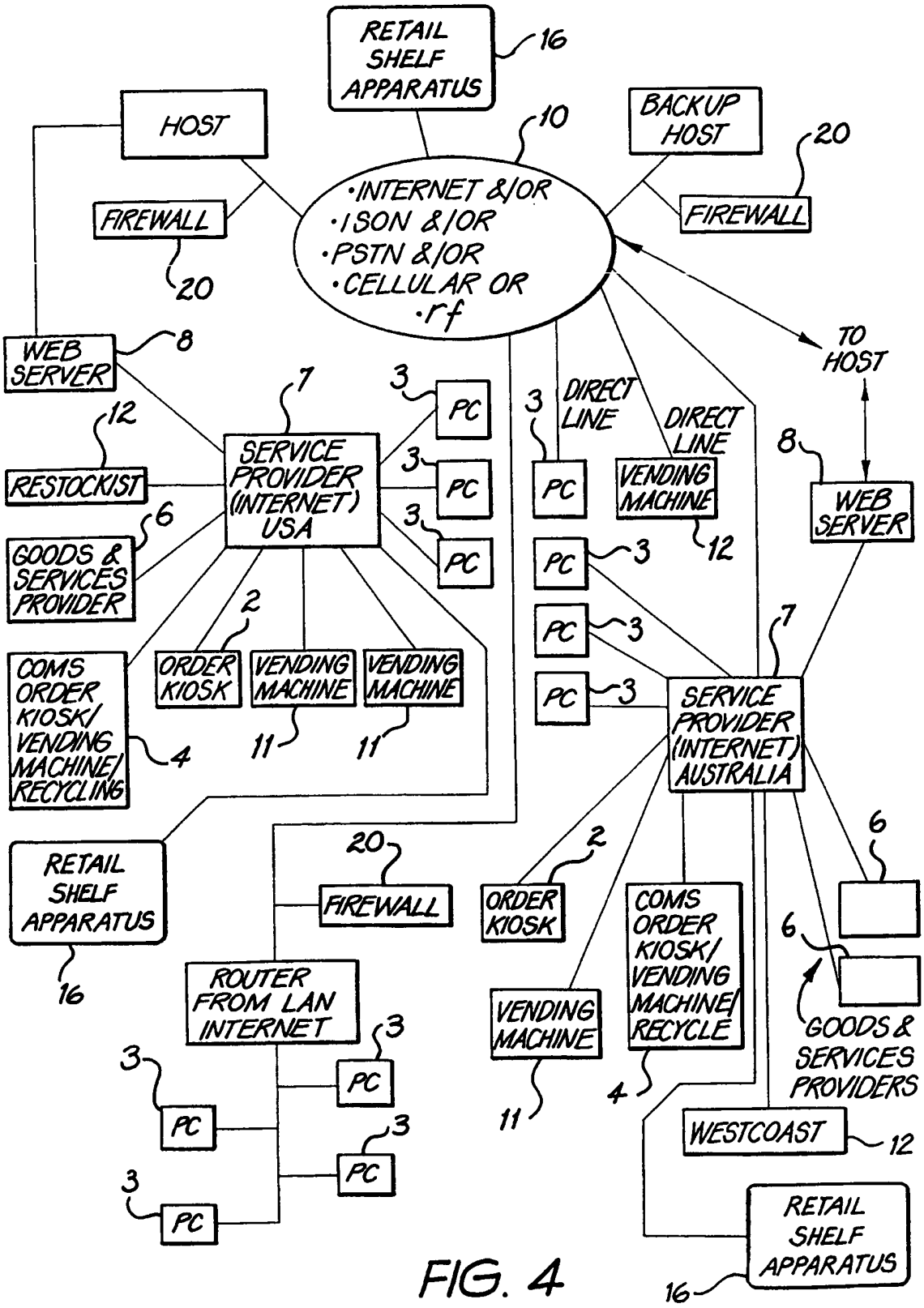

RETAIL SHELF APPARATUS
16
HOST
10
BACKUP HOST
20
FIREWALL
20
•INTERNET &/OR
•ISON &/OR
•PSTN &/OR
•CELLULAR OR
•rf
FIREWALL
TO HOST
WEB SERVER
8
7
3
PC
3
DIRECT LINE
DIRECT LINE
12
RESTOCKIST
SERVICE PROVIDER (INTERNET) USA
3
PC
3
PC
VENDING MACHINE
12
8
WEB SERVER
6
GOODS & SERVICES PROVIDER
PC
3
2
PC
3
ORDER KIOSK
VENDING MACHINE
VENDING MACHINE
PC
3
7
COMS ORDER KIOSK/ VENDING MACHINE/ RECYCLING
4
11
11
SERVICE PROVIDER (INTERNET) AUSTRALIA
RETAIL SHELF APPARATUS
16
20
FIREWALL
2
ORDER KIOSK
6
6
ROUTER FROM LAN INTERNET
3
PC
3
PC
3
PC
3
PC
VENDING MACHINE
11
COMS ORDER KIOSK/ VENDING MACHINE/ RECYCLE
4
GOODS & SERVICES PROVIDERS
WESTCOAST
12
RETAIL SHELF APPARATUS
16

FIG. 4

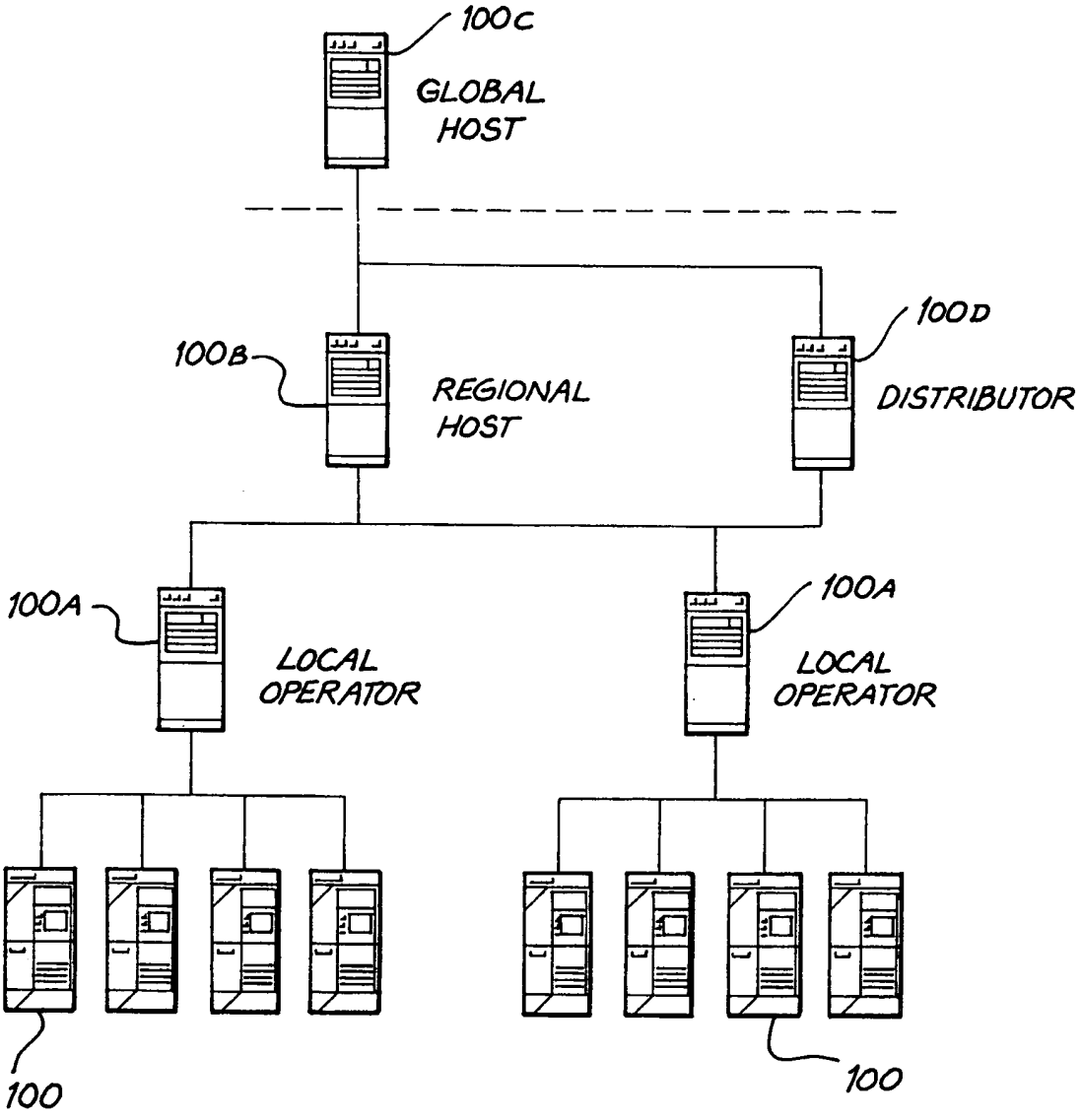

100C
GLOBAL HOST
100B
REGIONAL HOST
100D
DISTRIBUTOR
100A
LOCAL OPERATOR
100A
LOCAL OPERATOR
100
100

FIG. 5

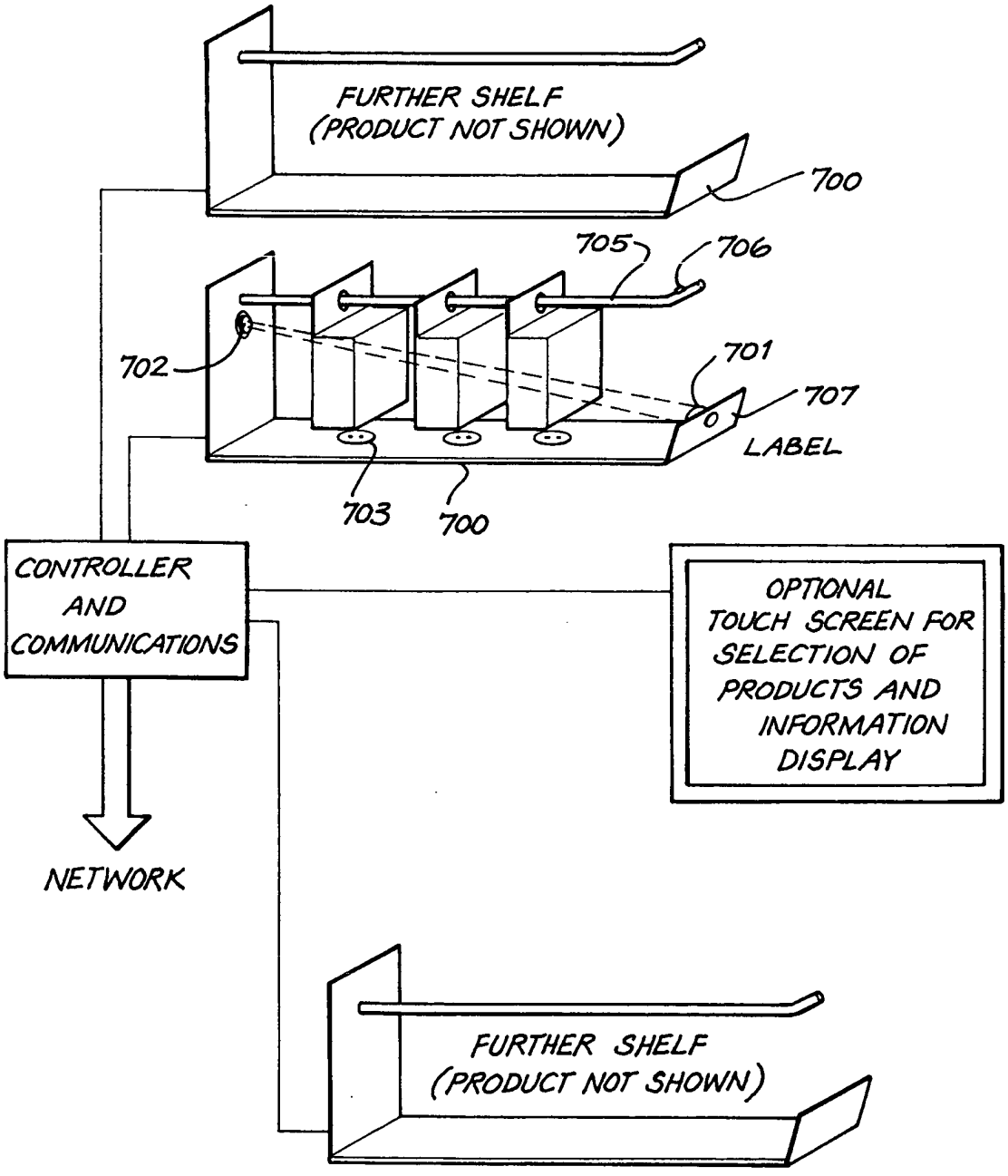

FURTHER SHELF
(PRODUCT NOT SHOWN)
700
705
706
702
701
707
LABEL
703
700
CONTROLLER
AND
COMMUNICATIONS
OPTIONAL
TOUCH SCREEN FOR
SELECTION OF
PRODUCTS AND
INFORMATION
DISPLAY
NETWORK
FURTHER SHELF
(PRODUCT NOT SHOWN)

FIG. 6

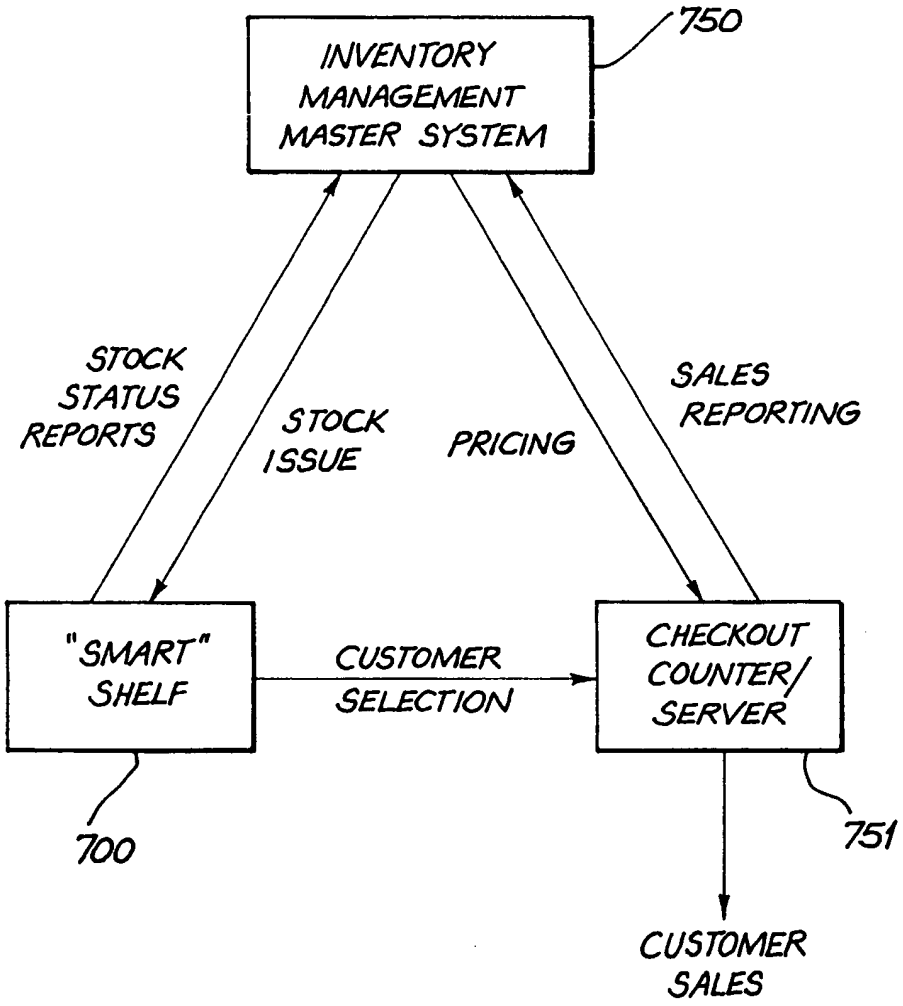

INVENTORY MANAGEMENT MASTER SYSTEM
750
STOCK STATUS REPORTS
STOCK ISSUE
PRICING
SALES REPORTING
"SMART" SHELF
CUSTOMER SELECTION
CHECKOUT COUNTER/ SERVER
700
751
CUSTOMER SALES

FIG. 7

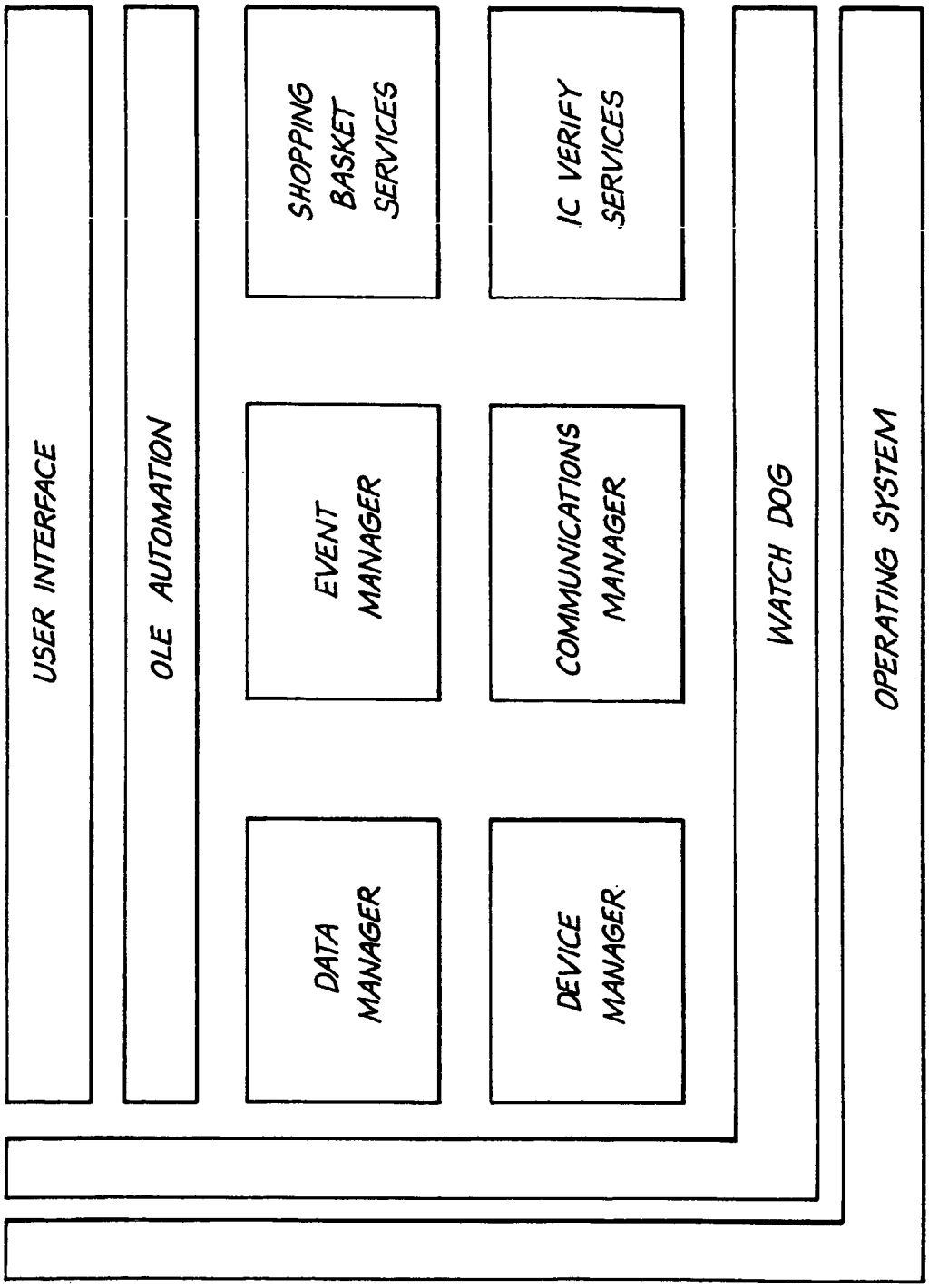

USER INTERFACE
OLE AUTOMATION
SHOPPING BASKET SERVICES
IC VERIFY SERVICES
EVENT MANAGER
COMMUNICATIONS MANAGER
DATA MANAGER
DEVICE MANAGER
WATCH DOG
OPERATING SYSTEM

FIG. 8

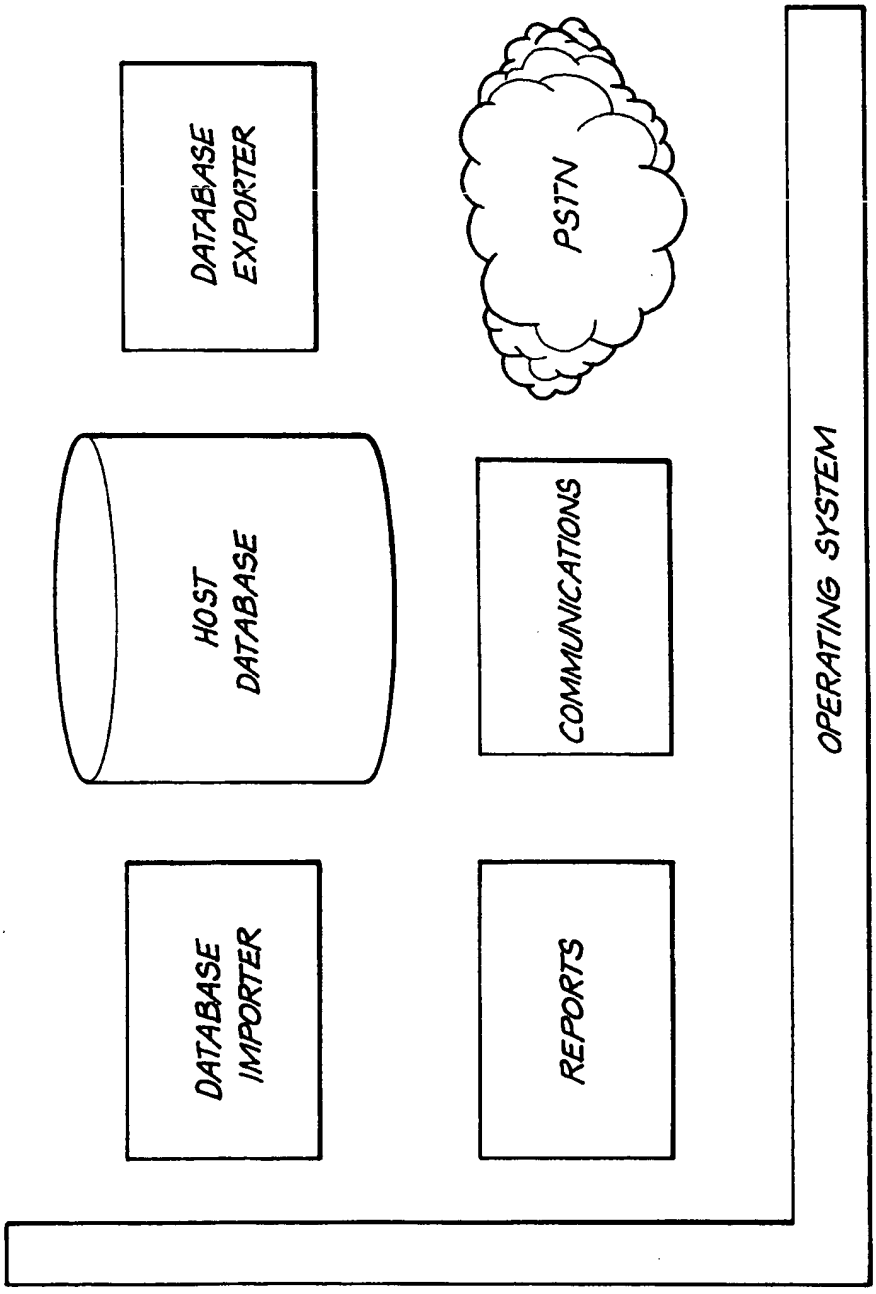

DATABASE EXPORTER
PSTN
HOST DATABASE
COMMUNICATIONS
OPERATING SYSTEM
DATABASE IMPORTER
REPORTS

FIG. 9

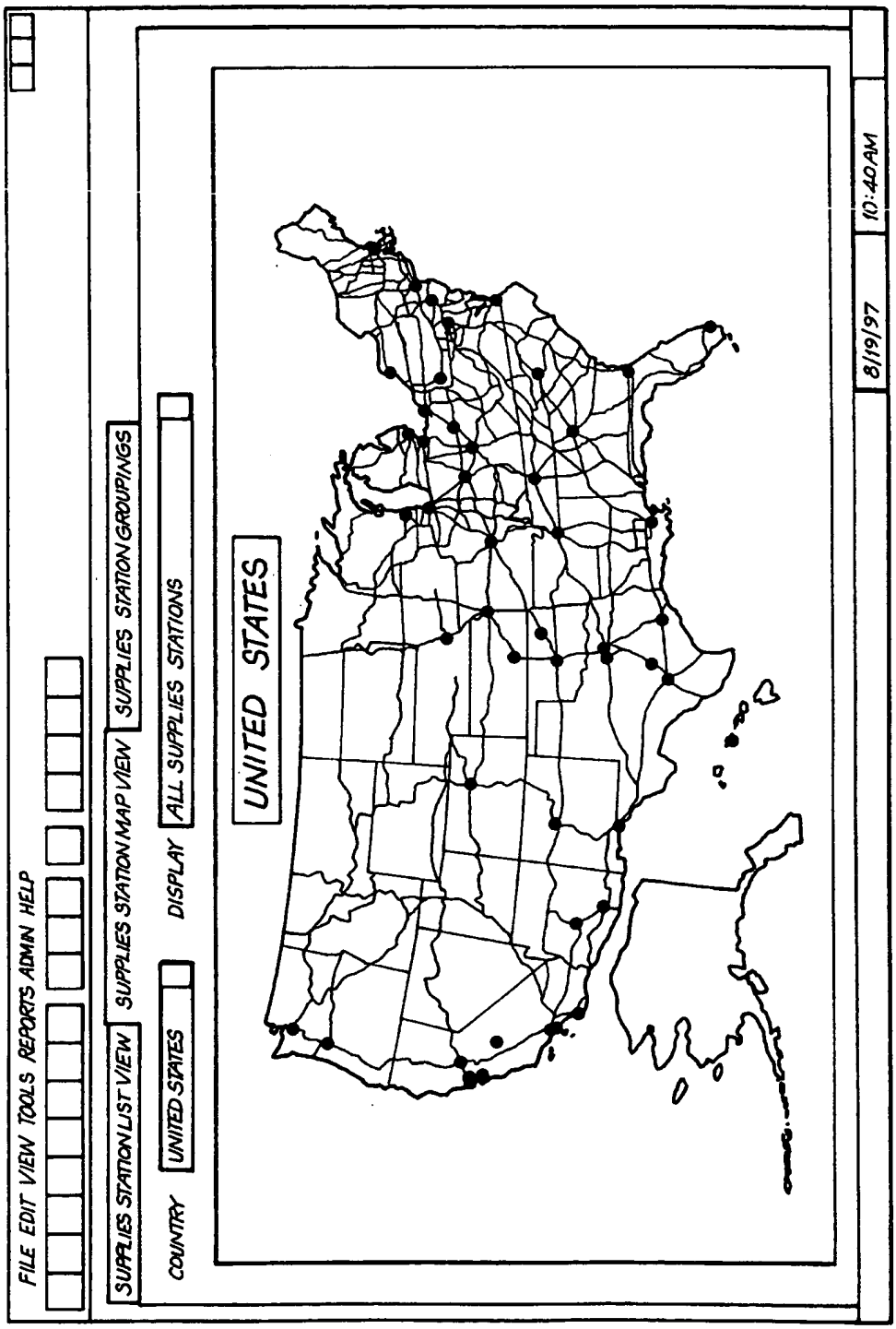

FILE EDIT VIEW TOOLS REPORTS ADMIN HELP
SUPPLIES STATION LIST VIEW
SUPPLIES STATION MAP VIEW
SUPPLIES STATION GROUPINGS
COUNTRY
UNITED STATES
DISPLAY
ALL SUPPLIES STATIONS
UNITED STATES
8/19/97
10:40AM

FIG. 10

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/AU 98/00654

A. CLASSIFICATION OF SUBJECT MATTER

Int Cl[6]: G06F 17/60, 153:00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
Int Cl[6]: G06F 17/60, 153:00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X P,Y	WO - 97/44749 A1 (PURCEL, D. S.) 27 November 1997	1, 4, 8, 15, 18-19 5-7, 9-11
X Y	WO - 94/28497 A1 (MOORE BUSINESS FORMS, INC.) 18 December 1994	1-4, 8, 15, 18-19 5-7, 9-11
Y	WO - 95/04333 A1 (FRAU, P. et al.) 9 February 1995	5, 6, 9

[X] Further documents are listed in the continuation of Box C

[X] See patent family annex

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
12 November 1998	19 NOV 1998
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200 WODEN ACT 2606 AUSTRALIA Facsimile No.: (02) 6285 3929	Authorized officer M. EMAMI Telephone No.: (02) 6283

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/AU 98/00654

C (Continuation) **DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO - 88/04085 A1 (HIGGINS, L. G.) 2 June 1988	5, 6, 9
X Y	GB - 2299074 A (HENLID LIMITED) 25 September 1996	12, 13 5, 7
X Y	WO - 96/31833 A1 (COWE, A. B. et al.) 10 October 1996	12, 13 5, 7
P,X P,Y	WO - 97/30410 A1 (POWELL, K. R.) 21 August 1997	14, 16, 17 5, 7, 9-11
X Y	WO - 96/27843 A1 (MULTIMEDIA SYSTEMS CORPORATION) 12 September 1996	14, 16, 17 5-7, 9-11
A	WO - 96/39671 A1 (POWELL, K. R.) 12 December 1996	
A	WO - 95/15533 A1 (BURKE, R. R.) 8 June 1995	

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/AU 98/00654

Box 1 Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

Considering independent claims only:
Claim 1 (and similarly claims 14 and 15) is directed to a product ordering apparatus comprising control means, input means and information means. Claim 12 (and similarly claim 13) is directed to a retail shelf apparatus including mounting means, sensor means and communication means.
Claims 1 and 12 do not cite any common (essential) feature, therefore, these claims define two different inventions.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims

2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International Application No.
PCT/AU 98/00654

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
WO	9744749	AU	31402/97	AU	32292/97	WO	9746822
WO	9428497	AU	67847/94	CN	1110068	EP	651898
		US	5694551				
WO	9504333	AU	76104/94	BR	9407166	CA	2168476
		CN	1128075	EP	716763	IT	93940134
		IT	1270801	US	5701252		
WO	8804085	AU	83221/87	AU	13802/92	CH	675959
		FR	2606896	GB	2208327	IT	1211924
		NZ	222620	US	4961507	GB	2239693
		CA	1324648	AU	82789/87	AU	69381/91
		CA	1305905	EP	335883	EP	502558
		GB	2224100	GB	2239936	US	4729396
		WO	8804381	US	4787414	US	4830039
		US	4921011	US	4928721	US	4971095
		US	5044390				
WO	9631833	EP	819277	US	2671362		
WO	9730410	AU	20507/97	US	5806044		
WO	9627843	AU	54200/96	CA	2214711	EP	815525
WO	9639671	AU	61478/96	CA	2223051	EP	836726
WO	9515533	AU	13338/95				
GB	2299074	EP	733985				
							END OF ANNEX